

CLAIMS

- 1) Emulgator-free microgel dispersed in an aqueous phase, obtainable by
 - a) producing a polyacrylate (A) in the presence of at least one compound (B) containing a phosphonic acid group, where the polyacrylate (A) has at least one hydroxyl group and at least one carboxyl group;
 - b) aqueous phase crosslinking of the reaction mixture originating from step a) with an aminoplast resin (C);
 - c) subsequent emulsion polymerization of the reaction mixture originating from step b) with at least one monomer composition (D) which contains at least one radically polymerizable double bond.
- 2) Emulgator-free microgel dispersed in an aqueous phase, obtainable by
 - a) producing a polyacrylate (A) in the presence of at least one compound (B) containing a phosphonic acid group, where the polyacrylate (A) has at least one hydroxyl group and at least one carboxyl group;
 - b) aqueous phase crosslinking of the reaction mixture originating from step a) with an aminoplast resin (C);characterized in that the reaction mixture originating from step b) is not subjected to any subsequent emulsion polymerization.
- 3) Microgel from claim 2, wherein the polyacrylate (A) originating from step a) is subjected to emulsion polymerization before step b) with at least one monomer compound (D) which contains at least one radically polymerizable double bond.
- 4) Microgel from one of the claims 1 to 3, wherein the polyacrylate (A) is obtainable by polymerization
 - of a monomer (i) with at least one polymerizable double bond and at least one hydroxyl group;
 - of a monomer (ii) with at least one polymerizable double bond and at least one carboxyl group;
 - of a monomer (iii) without a hydroxyl group and without a carboxyl group with at least one polymerizable double bond.
- 5) Microgel from one of the claims 1 to 3, wherein the compound (B) is an adduct from an alkyl-phosphonic acid with a compound containing an epoxide group.

- 6) Emulgator-free microgel dispersed in an aqueous phase, obtainable by
- a) production of a polyacrylate (E) by copolymerization
 - of a monomer (i) with at least one polymerizable double bond and at least one hydroxyl group;
 - of a monomer (ii) with at least one polymerizable double bond and at least one carboxyl group;
 - of a monomer (iv) with at least one polymerizable double bond and with at least one phosphonic acid group
 - b) aqueous phase crosslinking of the reaction mixture originating from step a) with an aminoplast resin (C);
 - c) subsequent emulsion polymerization of the reaction mixture originating from step b) with at least one monomer compound (D) which contains at least one radically polymerizable double bond.
- 7) Emulgator-free microgel dispersed in an aqueous phase obtainable by
- a) producing a polyacrylate (E) by copolymerization
 - of a monomer (i) with at least one polymerizable double bond and at least one hydroxyl group;
 - of a monomer (ii) with at least one polymerizable double bond and at least one carboxyl group;
 - of a monomer (iv) with at least one polymerizable double bond at and at least one phosphonic acid group;
 - b) aqueous phase crosslinking of the reaction mixture originating from step a) with an aminoplast resin (C);
- wherein the reaction mixture originating from step b) does not undergo subsequent emulsion polymerization.
- 8) Microgel from claim 7, wherein the polyacrylate (E) originating from step a) is subjected before step b) to emulsion polymerization with at least one monomer compound (D) which contains at least one radically polymerizable double bond.
- 9) Microgel from one of the claims 6 to 8, wherein copolymerization is carried out in the presence of an additional monomer (iii) without a hydroxyl group and without a carboxyl group, containing at least one polymerizable double bond.
- 10) Microgel from one of the claims 4 to 7, wherein the monomer (i) is selected from the group of hydroxyethyl(meth)acrylate, hydroxypropyl(meth)acrylate, hydroxybutyl(meth)acrylate and ϵ -caprolactame esterated on a hydroxy(meth)acrylate base.

- 11) Microgel from one of the claims 4 to 10, wherein the monomer (ii) is selected from the group of acrylic acid and methacrylic acid.
- 12) Microgel from one of the claims 4 to 11, wherein the monomer (iii) is selected from the group of hydroxyl group-free acryl(meth)acrylic acid esters and styrene.
- 13) Microgel from one of the claims 6 to 12, wherein the monomer (iv) is vinyl phosphonic acid.
- 14) Microgel from one of the preceding claims, wherein the aminoplast resin is a melamine resin.
- 15) Microgel from one of the preceding claims, wherein at least one monomer compound (D) has at least one hydroxyl group.
- 16) Microgel from one of the preceding claims, wherein emulsion polymerization is carried out in the presence of an additional monomer compound (D), which contains at least one radically polymerizable double bond and no hydroxyl groups.
- 17) Microgel from one of the preceding claims, wherein it has an acid number between 10 and 45 mg KOH/g.
- 18) Use of an emulgator-free microgel dispersion from one of the preceding claims to produce a multilayer coating, specifically in the automobile industry.
- 19) Use in accordance with claim 18 to produce a basecoat.
- 20) Use in accordance with claim 18 or 19, wherein the microgel percentage, relative to the solids of the coat obtainable therefrom, is between 20 and 85%, preferably between 20 and 65%.